

tion, therefore, between fertility and any mental or physical characteristic must work a progressive change.

We know that there are very considerable race and class differences in the matter of fertility. It is very difficult to understand how these could have arisen by the action of natural selection combined with heredity, unless either (1) fertility be inherited, or (2) fertility and some inherited mental or physical characteristic be correlated. But either (1) or (2) involves reproductive selection. We have seen that there is evidence of correlation between the stature of women and their fertility. There is also evidence of a correlation between fertility and class. Taking Copenhagen, for which alone we have satisfactory class-fertility statistics, it is possible to show :

- (i) That the gross fertility of the artisan is more than the gross fertility of the professional classes.
- (ii) That the net fertility of the artisan is less than the net fertility of the professional classes.

Thus natural selection, at first sight, checks reproductive selection, greater fertility connoting a greater death-rate; but we find :

- (iii) That the marriage-rate of the artisan is so much higher than the marriage-rate of the professional classes, that the percentage fertility of the former considerably exceeds that of the latter.

Thus, while a selective death-rate checks reproductive selection as between class and class, a selective marriage-rate again places reproductive selection at an advantage as compared with natural selection; the population would accordingly appear to be ultimately, and in the long run, reproducing itself from the artisan classes.

I hope, later, to publish the analysis, curves, and statistics on which these conclusions are based; at present I only wish to draw attention to the general result: that reproductive selection—at any rate in civilised man—seems a factor of evolution equipotent to natural selection, if, indeed, it be not prepotent.

II. “On the Diurnal Periodicity of Earthquakes.” By CHARLES DAVISON, M.A., F.G.S., Mathematical Master at King Edward’s High School, Birmingham. Communicated by Professor POYNTING, F.R.S. Received February 15, 1896.

(Abstract.)

Reference is made to the previous work of De Montessus and Ōmori, the former endeavouring to show that the diurnal periodicity of earthquakes is apparent rather than real, and the latter pointing

out that a marked diurnal periodicity characterises the after-shocks of great earthquakes in Japan.

The results of twenty-six registers obtained by means of continuously recording instruments in Japan, the Philippine Islands, and Italy are subjected to harmonic analysis with the following conclusions :—

(1) The reality of the diurnal variation of earthquake-frequency seems to be proved by the approximate agreement in epoch (mean local time) of the first four components (24, 12, 8, and 6 hours) for the whole year at Tokio and Manila, and for the winter and summer halves of the year at Tokio.

(2) In ordinary earthquakes, there is in nearly every case a marked diurnal period, the maximum generally occurring between 10 A.M. and noon. The semi-diurnal period, though less prominent, is also clearly marked, the maximum occurring as a rule between 9 A.M. and noon and between 9 P.M. and midnight. Other minor harmonic components are also occasionally important, the first maximum of the eight-hour component probably occurring about 6.30 A.M., and that of the six-hour component about 3 or 4 A.M.; but for these two epochs the results are not always concordant.

(3) Though the materials are insufficient for any general conclusion, the weaker shocks seem to be subject to a more marked diurnal periodicity.

(4) In the case of after-shocks of great earthquakes, the diurnal periodicity is as a rule strongly pronounced. The maximum of the diurnal period occurs within a few hours after midnight, but the epochs of the other components are subject to wide variation, possibly on account of the short intervals over which the records extend. A special feature of after-shocks is the prominence of the eight-hour and four-hour components.

The epochs of the first four components representing the diurnal variation of seismic frequency are compared in several cases with those for barometric pressure and wind velocity. While the variation of the former cannot be attributed exclusively to either of the latter phenomena, it seems not improbable that the diurnal periodicity of ordinary earthquakes may be due chiefly to that of wind velocity, and the diurnal periodicity of after-shocks chiefly to that of barometric pressure.